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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,046	08/30/2000	PRADEEP K. SUBRAHMANIAN	S01.12-0632/SEA 9334	2354
7590	03/09/2005		EXAMINER	
ROBERT M ANGUS WESTMAN CHAMPLIN & KELLY 900 SECOND AVENUE SOUTH INTERNATIONAL CENTRE SUITE 1600 MINNEAPOLIS, MN 55402-3319			JONES, HUGH M	
		ART UNIT	PAPER NUMBER	
		2128		
DATE MAILED: 03/09/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/651,046	SUBRAHMANYAN, PRADEEP K.	
	Examiner Hugh Jones	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 15 October 2004.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,2 and 5 is/are rejected.
- 7) Claim(s) 3-4, 6-8 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)              |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____.  |

**DETAILED ACTION**

1. Claims 1-8 of U. S. Application 09/651,046 are pending.

**Claim Rejections - 35 USC § 112**

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for *disc drives*, does not reasonably provide enablement for *storage devices* in general. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make/use the invention commensurate in scope with these claims. For example, the specification does not disclose any disturbance model for a solid-state memory device.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The claims recite various limitations such as inertia matrices, mount damping and stiffness parameters. There is insufficient antecedent basis for this limitation in the claim, if the storage system refers to anything except for a disc drive.

**Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or

unobviousness.

8. **Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. ("K") in view of Brown et al. ("B") or Lee ("L").**

9. Kim et al. disclose

A process of designing an optimal vibration mount for a storage system comprising steps of:

computing an external disturbance model for the storage system (*it is interpreted that storage system refers to disc drives in so far as that is the only embodiment disclosed in the specification; furthermore, the preamble recites "vibration mount"; Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.*);

computing an internal disturbance model for the storage system (*it is interpreted that storage system refers to disc drives in so far as that is the only embodiment*

*disclosed in the specification;* Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.);

defining an inertia matrix for the storage system (*it is interpreted that storage system refers to disc drives in so far as that is the only embodiment disclosed in the specification;* Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.);

defining state estimator based on the inertia matrix and external and internal disturbance models to minimize defined norm of a state estimation error (Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.);

calculating the gain of the state estimator as a solution filter algebraic Riccati equation (Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.); and

defining optimal mount damping and stiffness parameters based on the calculated state estimator gain (Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.).

wherein step (e) includes,

calculating covariance matrix based on the solution to the filter algebraic Riccati equation (Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.), and

calculating the state estimator gain based on the covariance matrix (Kim et al. disclose use of the Riccati solutions to the reduction of vibration in rotational drives including inertial matrices (sections 2-4) for internal disturbances.).

10. Kim et al. do not appear to disclose taking into account "external" disturbances in addition to the internal disturbances.

11. Brown et al. disclose external as well as internal disturbances to motor drives. Environmental factors such as seismic **vibration** and temperature change, which indirectly contribute to servowriting errors, are identified, and steps to contain these error sources are described. See section 2-3 on page 414.

12. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Kim teaching with the Brown teaching because Brown teaches that external disturbances affect servowriting (col. 2, page 414).

13. Lee disclose external disturbances, in the context of the claimed invention (section I).

14. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Lee teaching with the Lee teaching because Lee teaches that external disturbances affect rotor behavior (abstract and section I).

15. **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. in view of Brown et al. and in further view of (Reif et al. or Shah et al.).**

16. Kim et al. is silent on whether the state estimator is a Kalman filter.

17. Reif et al. disclose an observer for continuous-time nonlinear systems. The observer gain is computed by a Riccati differential equation similar to the extended

Kalman filter. They prove that under certain conditions the proposed observer is an exponential observer by choosing an appropriate Lyapunov function. Furthermore, the authors explore some important relations of the proposed observer to robust control theory and  $H_\infty$ -filtering. To examine the practical usefulness of the proposed observer they applied it to an induction motor for the estimation of the **rotor** flux and the angular velocity.

18. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Kim teaching with the Reif et al. teaching because Reif et al. teaches that use of the Kalman filter approach is known in the art (col. 1, page 203) and that they extend and improve the Kalman filter approach (col. 1, page 203).

19. Shah et al. disclose a combined Kalman filter/Riccati approach to state estimation of non-linear systems.

20. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Kim teaching with the Shah et al. teaching because Shah et al. teaches that the use of a combined Kalman filter/Riccati approach (col. 3, line 11 to col. 4, line 46 in the context of state estimation, was known in the art.

#### Allowable Subject Matter

21. Claims 3-4, 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The novel material relates to the particular

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form of the covariance matrix which is calculated from the filter algebraic Riccati equation.

**Response to Arguments**

22. Applicant's arguments, submitted 10/15/2004, have been carefully considered, but are not persuasive.

23. Applicants are thanked for the correction to the drawings.

24. Applicant's arguments pertaining to the prior art rejections are not persuasive.

Applicants have merely paraphrased selected portions of the applied art without addressing the sections of the applied art as indicated in the last office action.

Furthermore, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). For example, Applicants allege that Brown merely identifies that external disturbances exist... That is what the office action also stated. But, a 103 rejection was applied, not a 102 rejection.

**Conclusion**

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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26. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

27. **Any inquiry concerning this communication or earlier communications from the examiner should be:**

**directed to:** Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, **or** the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

**mailed to:** Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:** (703) 308-9051 (for formal communications intended for entry) **or**

(703) 308-1396 (for informal or draft communications, please label  
"PROPOSED" or "DRAFT").

Dr. Hugh Jones

Primary Patent Examiner

February 28, 2005



HUGH JONES, P.D.  
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